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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ari Karkkainen

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NIXON & VANDERHYE, PC  
901 NORTH GLEBE ROAD, 11TH FLOOR  
ARLINGTON, VA 22203

EXAMINER

KALAM, ABUL

ART UNIT

PAPER NUMBER

2814

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/528,388	<b>Applicant(s)</b> KARKKAINEN, ARI	
	<b>Examiner</b> Abul Kalam	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 2-13, 15-20, 24-28, 30-37, 43, 44 and 46-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 14, 21-23, 29, 38-42, 45 and 54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 14, 21-23, 29, 38-42, 45 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanisawa (US 5,478,778; previously cited by applicant) in view of Iha (2001/0014429; previously cited by Applicant).

With respect to claim 1, Tanisawa teaches a substrate-based assembly for carrying optical and/or electrical components (Fig. 4), the assembly comprising:

a substrate (1, Fig. 4);

at least one optical component (31, Fig. 4) assembled with at least one different component (5 and 8) for use together in providing a function in use of the assembly (col. 4, lines 27-40);

a packaging layer (33, Fig. 4) for said assembled components, the assembled components (5, 8 and 31) and the packaging layer (33) being carried by the substrate (1);

wherein the packaging layer (33) comprises a glass material (silica, col. 4, line 59) and is provided with at least one recess (openings in layer 33 defined by sidewalls 32) for use in assembling said components, being otherwise substantially continuous (col. 5, lines 7-51: the sidewalls 32 of the packaging layer 33 surround elements 23).

Thus, Tanisawa discloses all the limitations of the claim with the exception of explicitly disclosing wherein the packaging layer comprises a hybrid glass material having both organic and inorganic components.

However, Iha discloses a packaging material for optical and electrical components, wherein the packaging layer comprises a glass material having both organic and inorganic components (¶ [0017]-[0020]). Such a hybrid glass material, as disclosed by Iha, improves the reliability of a package by preventing shrinkage, diffusion of conductive components and gelation (¶ [0019]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to incorporate the teaching of Iha into the device of Tanisawa, to form the package layer using a hybrid glass material, which comprises both organic and inorganic components, for the disclosed purpose of improving the structure and reliability of the package (¶ [0019]).

With respect to claim 14, Tanisawa discloses wherein said at least one optical component (31) is bump bonded (Fig. 4).

With respect to claim 21, Tanisawa discloses wherein said at least one different component (5, Fig. 4) comprises an electronic device (semiconductor chip, col. 6, lines 47-48).

With respect to claim 22, Tanisawa discloses wherein the electronic device (5, col. 4, lines 47-48) comprises an integrated circuit (it is well known and obvious for semiconductor chips to contain integrated circuits).

With respect to claim 23, Tanisawa discloses wherein the optical component (31) comprises an active optical component (laser diode array, col. 4, lines 35-36) and said at least one different component (5 and 8) comprises a passive optical component (8).

With respect to claim 29, Tanisawa discloses wherein the at least one recess (openings in layer 33 where electrodes 22 are formed, Fig. 4) comprises an aperture to give access to an electric interconnect structure (23).

With respect to claims 38 and 39, Tanisawa discloses wherein said at least one optical component (31) comprises an active optical component, such as a laser (col. 4, ln. 35-36).

With respect to claims 40-42, Tanisawa discloses wherein said at least one recess (openings in layer 33 wherein electrodes 22 are formed, Fig. 4) comprises an aperture to give access to an electrical interconnect structure (23) and wherein the active optical component (31) is bump-bonded or flip-chip mounted (Fig. 4) in the assembly to provide the electrical interconnect structure (23); and wherein the active optical component comprises a laser (col. 4, ln. 35-36), the assembly further comprising an optical modulator (8, Fig. 6) external to the laser (col. 4, lines 35-40).

With respect to claim 45, Tanisawa teaches an opto-electronic equipment (Fig. 4) comprising a substrate based assembly (col. 4, lines 27-40).

With respect to claim 54, Tanisawa teaches a substrate-based assembly for carrying optical and/or electrical components (Fig. 4), the assembly comprising:

a substrate (1, Fig. 4);

at least one optical component (31, Fig. 4) assembled with at least one different component (5 and 8) for use together in providing a function in use of the assembly (col. 4, lines 27-40);

a packaging layer (33, Fig. 4) for said assembled components, the assembled components (5, 8 and 31) and the packaging layer (33) being carried by the substrate (1);

wherein the packaging layer (33, Fig. 4) comprises a glass material (silica, col. 4, line 59) and is provided with at least one recess (openings in layer 33 defined by sidewalls 32) for use in assembling said components, said recess having a perimeter which is substantially closed (col. 4, lines 56-58: the recess formed by sidewalls 32 of the insulating layer 33 surround solder bumps 23) into which an electrical interconnect structure (22/23) is assembled (col. 5, lines 7-51).

Thus, Tanisawa discloses all the limitations of the claim with the exception of explicitly disclosing wherein the packaging layer comprises a hybrid glass material having both organic and inorganic components.

However, Iha discloses a packaging material for optical and electrical components, wherein the packaging layer comprises a glass material having both organic and inorganic components (§ [0017]-[0020]). Such a hybrid glass material, as disclosed by Iha, improves the reliability of a package by preventing shrinkage, diffusion of conductive components and gelation (§ [0019]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to incorporate the teaching of Iha into the device of Tanisawa, to

form the package layer using a hybrid glass material, which comprises both organic and inorganic components, for the disclosed purpose of improving the structure and reliability of the package (¶ [0019]).

### ***Response to Arguments***

2. Applicant's arguments filed on June 23, 2010, have been fully considered but are not persuasive.

Applicant argues that neither of the cited references teaches or suggests any packaging layer. The argument is not persuasive. Tanisawa clearly teaches an insulating layer 33 (Fig. 4) which surrounds interconnect structures 23 (col. 4, lines 56-59) and supports the optical component 5 (col. 5, lines 45-60), and thus, the insulating layer functions as a packaging layer. The insulating layer 33 provides both support and protection for the interconnect features 23, as explained by prior art figs. 2A-2C, which do not include the insulating layer, and Figs. 5A-5C which include the insulating layer. Furthermore, the insulating layer 33 of Tanisawa functions similar to applicant's packaging layer 200 in Fig. 12, in that Tanisawa's insulating layer 33 surrounds interconnect structures 23. Furthermore, the recesses within the insulating layer 33 is similar to the recesses within applicant's packaging layer 200 as shown in Fig. 7, where there are complete breaks or gaps exposing the principal surface of applicant's substrate 100. Also note, Tanisawa discloses that the insulating layer is formed of silica (col. 4, lines 59: SiO<sub>2</sub>) which is a well known packaging material in the semiconductor art. Finally, the combined teachings of Tanisawa and Iha read on all the structural

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limitations of the claim, as set forth in the rejection above. It has been held that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977) and MPEP 2112.01.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abul Kalam whose telephone number is (571)272-8346. The examiner can normally be reached on Monday - Friday, 9 AM - 5 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M.



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Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. K./  
Examiner, Art Unit 2814

/Wael M Fahmy/  
Supervisory Patent Examiner, Art  
Unit 2814